

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/US2004/016409

International filing date (day/month/year)  
19.05.2004

Priority date (day/month/year)  
19.05.2003

International Patent Classification (IPC) or both national classification and IPC  
H01L51/30, H01L51/52, H01B1/12, C08G61/12, C08G73/02, C08K3/10

Applicant  
E.I. DUPONT DE NEMOURS AND COMPANY

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-19
Inventive step (IS)	Yes: Claims	
	No: Claims	1-19
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re. Item V:**

1. Relevant cited prior art:
  - D1: US-A-2002/179900
  - D2: US-A-2001/022497
  - D3: Elschner A. et al.: "High-resistivity PEDT/PSS for Reduced Crosstalk in Passive Matrix OELs" ASIA DISPLAY / IDW'01. Proceedings of the 21st International Display Research Conference in Conjunction with the 8th International Display Workshops. Nagoya, Japan, Oct. 16 - 19, 2001, International Display Research Conference. Idrc, San Jose, CA : SI, vol. CONF. 21 / 8, 16 October 2001 (2001-10-16), pages 1427-1430.
  - D4: Elschner A. et al.: "PEDT/PSS for Efficient Hole-injection in Hybrid Organic Light-emitting Diodes" Synthetic Metals, Elsevier Sequoia, Lausanne, CH, vol. 111/112, 1 June 2000 (2000-06-01), pages 139-143, ISSN: 0379-6779
  - D5: US-A-5 578 249
  - D6: US 2001/044492
  - D7: US-A-2003/087991
2. Novelty and inventive step
  - 2.1 According to the description of the current specification (pg. 22, Table 3) and information available from the supplier, the commercially available product Baytron P® (both Al4083 and CH8000 products) employed is an aqueous composition of a doped thiophene polymer [PEDT/PSS] already containing a Group 1 metal cation, namely Na<sup>+</sup> in a maximum amount of 400ppm (0.4 mmoles per gram dried polymer). Thus, compositions of Baytron P® containing additional solvent are novelty-destroying for at least claim 1.
  - 2.2 D2 describes Baytron P® Al4083 used in a coating composition used in an EL device comprising isopropyl alcohol co-solvent (Example D-1-1; [0237-0241]). D4 (pg. 140; Fig. 1) similarly describes the preparation of a hole-injecting layer of a LED device.  
D6 relates to coating composition comprising Baytron P® aqueous dispersion and describes various composition thereof in various solvents (Tables 1 to 3).  
Thus, a compositions comprising doped conductive polymer, Group 1 metal cation and co-solvent are disclosed in D2, D4, and D6.
  - 2.3 D5 discloses a process for the production electrically conductive doped polyaniline by casting a film from solution containing imino-p-phenylene polymer and protonic

acid salt, then treating with a solution containing protonic acid and oxidiser (claim 1). Examples 3, 7, and 9 describe coating compositions comprising said doped polyaniline in aqueous solution in the presence of co-solvent (NMP; DMSO) and a sodium salt yielding sodium cations.

D7 refers to ink receptive film for coating substrates. Example I describes a latex formulation comprising water, NMP co-solvent, a sodium salt and Baytron P® ([0055]).

- 2.4 According to Example 2 (page 23) of the application, the co-solvent is removed completely, such that the buffer layers and devices of claims 17 and 18 of the specification are co-solvent-free.  
Thus, the disclosures of D1-D3, and D4 are considered to take away the novelty of said claims 17 and 18.
- 2.5 Therefore, the subject-matter of claims 1 to 19 appear to be lacking in novelty according to Article 33(2) PCT and inventive step under Article 33(3) PCT in view of the prior disclosures D1 to D7.
- 2.6 D1, relating to an OLED which comprises a conductive transparent polymer layer having preset low sulfate ion and high metal ion content to improve the lifetime and anode shrinkage and efficiency, can be considered to represent the closest prior art (see Table 1; [0006-0011]; Fig. 2; Examples).  
Example 1 describes the formation of a hole-injecting electrode made up of Baytron P® on an ITO layer by spin coating. The difference of the application appears to be the explicitly mentioned presence of solvent, although the use of solvents in the spin coating process are conventional (refer to [0005] of D1).  
D3 (pg. 1430) relates drying conditions to the bulk conductivity of conductive films containing Baytron P® in EL devices, such that any advantage associated with presence of co-solvent in the aqueous dispersion prior to spin coating is anticipated. Hence, the application does not appear to involve an inventive step in view of a combination of D1 and D3.

**Re. Item VIII:**

1. The use of the term "about" to delimit ranges of physical values in both description and claims renders said ranges unclear, and should be deleted (Article 6 PCT).  
In addition, the last passage on page 27 seems irrelevant.